IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re the application of: Smith *et al.*		Docket:	TI-22782B
Serial No.:	TBD	Examiner:	TBD
Filed:	Herewith	Art Unit:	TBD
For:	Polyol-Based Method For Forming Thin Film Aerogels On Semiconductor Substrates		

PRELIMINARY AMENDMENT

January 8, 2001

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Ass't Commissioner for Patents
Washington, D. C. 20231

Examiner:

Prior to examination and calculation of fees, please amend the above-identified application as follows:

IN THE SPECIFICATION:

Page 1, before line 1, insert --This application is a continuation of U.S. application number 09/115,854 filed 07/15/98, which is a continuation of U.S. application number 08/748,926 filed 11/14/96.--

Page 6, line 9, please replace "TBD (Attorney's Docket TI-21623)"

with --08/746,679--.

Page 12, line 6, change "Figure 3 shows" to --We have compared--;

Page 16, line 9, change "Figure 14" to --Figure 3--;

Page 17, line 2, please replace "TBD (Attorney's Docket TI-21623)"

with --08/746,679--.

Page 17, line 4, delete "Figure 4 shows" to --We have compared--;

Page 17, lines 5 and 6, change "As the figure shows" to --This comparison shows--;

Page 17, line 9, change "reported in Figure 4 are" to --in our comparison were--;

Page 21, lines 8 and 9, change "Figure 3 contains a graph of the variation of modulus with density for a non-glycol-based gel and an ethylene glycol-based gel." to --Figure 3 contains a graph showing the shrinkage of a thin film when dried in a 1 mm thick container.--;

Page 21, lines 10 and 11, change "Figure 4 contains a graph of the viscosity variation as a function of alcohol volume fraction for ethylene glycol/alcohol mixtures." to --Figure 4 contains a graph of the theoretical molar ratio of glycerol molecules to metal atoms vs. porosity of a nanoporous dielectric according to the present invention.–;

Page 22, lines 7 and 8, cancel "Figure 14 contains a graph showing the shrinkage of a thin film when dried in a 1 mm thick container."

Page 22, lines 9 and 10, cancel "Figure 15 contains a graph of the theoretical molar ratio of glycerol molecules to metal atoms vs. porosity of a nanoporous dielectric according to the present invention."; and

Page 29, line 17, change "Figure 15" to --Figure 4--.

IN THE DRAWINGS:

Please renumber Figure 14 to Figure 3 and Figure 15 to Figure 4 as shown in the informal copies attached.

IN THE CLAIMS:

Please delete Claims 1 - 42.

Please add claims 43 - 55 as shown below.

43. A method for forming a thin film aerogel on a semiconductor substrate, the method comprising the steps of:

a) providing a semiconductor substrate comprising a microelectronic circuit;

b) depositing an aerogel precursor sol upon said substrate; wherein said aerogel precursor sol comprises

a metal-based aerogel precursor reactant, wherein said reactant is a compound containing metal atoms, and

a first solvent comprising a first polyol; wherein,

the molar ratio of said first solvent molecules to the metal atoms in said reactant is at least 1 first solvent molecule per 16 metal atoms;

c) allowing said deposited sol to create a gel, wherein said gel comprises a porous solid and a pore fluid; and

d) forming a dry aerogel by removing said pore fluid in a drying atmosphere,

wherein the pressure of said drying atmosphere during said forming step is less than the critical pressure of said pore fluid, and

the temperature of said substrate during said forming step is above the freezing temperature of said pore fluid.

44. A method for forming a thin film nanoporous dielectric on a semiconductor substrate, the method comprising the steps of:

a) providing a semiconductor substrate;

b) depositing an aerogel precursor sol upon said substrate; wherein said aerogel precursor sol comprises

a metal-based aerogel precursor reactant, wherein said reactant is a compound containing metal atoms, and

a first solvent comprising a polyol; wherein,

the molar ratio of said first solvent molecules to the metal atoms in said reactant is at least 1 first solvent molecule per 16 metal atoms;

c) allowing said deposited sol to create a gel, wherein said gel comprises a porous solid and a pore fluid; and

d) forming a dry, nanoporous dielectric by removing said pore fluid in a drying atmosphere,

wherein the pressure of said drying atmosphere during said forming step is less than the critical pressure of said pore fluid, and

the temperature of said substrate during said forming step is above the freezing temperature of said pore fluid.

45. The method of claim 44, wherein:

the molar ratio of said first solvent molecules to the metal atoms in said reactant is no greater than 12 : 1.

46. The method of claim 44, wherein:

the molar ratio of said first solvent molecules to the metal atoms in said reactant is between 1 : 2 and 12 : 1.

47. The method of claim 44, wherein:

the molar ratio of said first solvent molecules to the metal atoms in said reactant is between 2.5 : 1 and 12 : 1.

48. The method of claim 44, wherein:

said nanoporous dielectric has a porosity greater than 60% and an average pore diameter less than 100 nm.

49. The method of claim 44, wherein:

said method does not comprise the step of adding a surface modification agent before said forming step.

50. The method of claim 44, wherein:

said nanoporous dielectric has a porosity greater than 60% and an average pore diameter less than 100 nm;

wherein, said method does not comprise the step of adding a surface modification agent before said forming step.

51. The method of claim 44, further comprising the step of:

aging said gel before said forming step.

52. The method of claim 51, wherein:

at least part of said aging step is performed in a substantially closed container.

53. The method of claim 51, wherein:

the temperature of said gel during said aging is greater than 30 degrees C.

54. The method of claim 51, wherein:

the temperature of said gel during said aging is greater than 80 degrees C.

55. The method of claim 51, wherein:

the temperature of said gel during said aging is greater than 130 degrees C.

REMARKS

If Examiner has any comments or suggestions, Applicants respectfully request that Examiner contact the undersigned in order to expeditiously resolve any outstanding issues.

Respectfully submitted,

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